Biology 138 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NOVA Cancer Webquest Block 1 2 3 4 A B

Use this web address to access NOVA online: <http://www.pbs.org/wgbh/nova/>

Once on the NOVA Website, in the “Search Nova Beta” box, type in **cancer**. A variety of results will show up; we will be using a few of these interactive sites today in our webquest. Each section of this webquest corresponds to an interactive site on this page. Once you finish with one interactive, close it and find the next.



**A. How Cancer Grows and Spreads**

1. What will this interaction illustrate?

2. Describe how the terms “carcinoma” and “epithelial tissues” are related.

3. What is the function of the DNA?

4. “This piece of DNA is an exact copy of the DNA from which it came.” Explain this sentence in detail using your knowledge of interphase and mitosis.

5. Describe the structure of a DNA molecule.

6. What can be a possible cause of a mutation in a DNA molecule?

7. Define the term “carcinogen.” (You may need to reference notes.)

8. Explain the difference in replication between normal cells and cells with a genetic mutation.

9. In three to four sentences, describe what is occurring during the second, third, and fourth mutations.

10. Explain how the mutated cells “break through the membrane.”

11. What is angiogenesis?

12. Why is angiogenesis significant in the growth of the tumor?

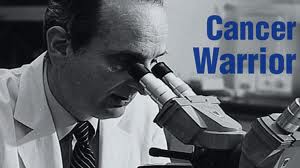
13. How do tumor cells use the blood vessels?

14. A tumor as small as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and send out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tumor cells into blood vessels in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

15. What is metastasis? Describe how tumor cells can form a new colony (tumors).

**B. Angiogenesis Explained**

1. When does normal angiogenesis occur?

2. Why is blood vessel growth critical in cancer?

3. Who discovered this “great epiphany?” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Describe how tumors promote the growth of blood vessels.

5. How does the cancer drug Avastin affect angiogenesis?

6. What do “adhesion molecules” do in regards to blood vessel growth?

7. What is the function of matrix metalloproteinasses (MMPs)?

8. “Blood vessel tubes close and form loops.” The graphic shows just one loop forming in the tumor; is this accurate?

9. Once blood flows directly to the tumor, this creates a potentially dangerous situation. Explain in detail.

10. How are doctors and researchers using this information regarding angiogenesis to treat cancer patients?

**C. Venom’s Healing Bite**

1. The death stalker scorpion’s venom contains chlorotoxin. How is this helpful in targeting cancer?



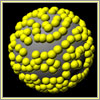
2. Describe at least three ways that researchers hope to use chlorotoxin in the fight against cancer.

3. What is interesting about the venom of the southern copperhead that makes it valuable to cancer researchers? (Be specific about the chemical in the venom and what it does.)

4. What causes the pain associated with a honeybee sting?

5. How are researchers using this chemical to fight cancer? (Be specific!)

6. How can venoms be used to control blood pressure and break blood clots?

**D. Cancer Nanotech**

1. How big is a nanometer?

2. Why have scientists turned to nanotechnology for medical applications?

3. What are nanotubes? List 3 ways nanotubes could be used in medicine.

4. Describe a nanowire. How have researchers used nanowires in the study of cancer?

5. What are nanoshells and how can they be used against cancer cells?

6. Choose three of the following nanoparticles and describe what they are and their potential uses in the field of cancer research.

**Nanocantilever Liposomes**

**Quantum Dots Fullerenes**

**Nanopores Dendrimer**

**Gold Nanoparticles**

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b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:

c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: